Appendix J

Deployment Planning Tools

This Appendix discusses all the different planning tools used to enable deployment.

HIGH-LEVEL PLANNING TOOLS

J-1. The JOPES is the primary US system for deployment planning and execution. It is a comprehensive, integrated system of people, policies, procedures, and reporting systems supported by automated systems and applications. The JOPES (Table J-1) currently operates on the GCCS, and provides the capability to develop a TPFDD and to monitor its execution. JOPES was specifically designed to provide strategic deployment information useful to the NCA, the Joint Staff, and the Service Headquarters.

J-2. The GCCS is an integrated architecture of telecommunications, software, and computer equipment designed to support information sharing among various echelons of command, including the NCA, the Services and Defense Agencies, the Service elements, and Joint Task Forces. GCCS provides worldwide user-to-user information exchange for C2, communications, intelligence, functional and administrative management, including logistics, transportation, personnel, and medical support.

J-3. In basic terms, the core of GCCS is a COE that allows several different software suites to interface with each other and exchange data. Running on this COE are JOPES, JMASS (a suite of joint tools to access unit readiness and intelligence data, as well as to plan and execute non-combatant evacuation operations), and a number of utilities such as video teleconferencing and collaborative planning tools. Table J-1 lists these applications that will be fielded as part of GCCS Version 2.1, as well as the suites on which they are resident.

Table J-1. GCCS Applications and Functions

Application	Function	Application Suite
OPLANs and OPORDs	The JOPES automated data processing applications facilitate rapid building and updating of OPLANs and concept summaries in deliberate planning, and rapid development of effective options and OPORDs in crisis action planning. In GCCS Version 2.1 the JOPES requirements are developed using the RDA, AHQ, and S&M applications.	JOPES
Requirements Development and Analysis	Allows planners and operators to develop, edit, and manipulate the TPFDD.	JOPES
Ad Hoc Query	Allows planners and operators to define, design, and print reports for information and analysis.	JOPES

Table J-1. GCCS Applications and Functions (continued)

Application	Function	Application Suite
Scheduling and Movement	Application interfaces with USTRANSCOM's GTN, and provides in-transit movement information through planning allocations, manifested passenger and cargo information, and carrier schedules.	JOPES
Transportation Planning	JFAST application provides quick response capability to determine the transportation feasibility of an OPLAN or course of action.	JOPES
Logistics Planning	The Logistics Sustainment Analysis and Feasibility Estimator application provides the capability to both estimate logistics sustainment requirements and evaluate material supportability.	JOPES
Mobilization Planning	The Force Augmentation Planning and Execution System application assists planners with mobilization planning, analysis, and execution by forecasting mobilization requirements, identifying manpower resources for each COA, and monitoring the status and progress of mobilization.	JOPES
Medical Planning	The Medical Planning and Execution System application provides combatant command medical planners with the capability to perform gross medical feasibility and supportability assessments of operation plans.	JOPES
Civil Engineer Planning	The Joint Engineering Planning and Execution System application supports combatant command engineers in developing civil engineering support plans.	JOPES
Unit Status	The GSORTS application provides both map-based query and display of joint information on the status of units with respect to personnel, equipment, and training.	JMASS
National Reconnaissance	The Global Reconnaissance Information System application provides automated support for the Joint Staff, unified and functional commands, National Security Agency, and Defense Intelligence Agency. It provides near real-time mission status to the JCS, and generates worldwide airborne Sensitive Reconnaissance Operations schedule requests.	JMASS
Non-Combatant Evacuation	The Evacuation File Maintenance and Retrieval System application supports non-combatant evacuation planning and operations. It responds to queries concerning the number of non-combatant personnel to be evacuated in a country or area.	JMASS
Fuel Planning	The Fuel Resources Analysis System application provides an automated capability for determining the fuel supportability of an OPLAN or COA.	JOPES
Utility Software	Utility services are provided as part of GCCS through integration of existing government applications, including message handling software, E-mail, office automation, teleconferencing, Telnet, and file transfer.	COE
Fused Operational Battlespace Picture	The JMCIS application is the foundation for the GCCS fused operational battlespace picture. Incorporated as part of the COE, it provides near real-time sea and air tracks, geographic display, contact correlation, and track database management.	COE
Intelligence	The JMCIS, NTCS-A, JDIS, and INTELINK-S applications within GCCS provide intelligence capabilities that include an authoritative and fused common tactical picture with integrated intelligence services and databases. It has access to theater, service, and national intelligence databases, transmittal and receipt of specific intelligence requests, and the inputting of intelligence data into a variety of operations and intelligence systems.	JMASS
Collaborative Planning	TARGET is a suite of distributed collaborative planning tools.	JOPES COE

THEATER TPFDD DEVELOPMENT

J-4. Once the high-level planning tools are used to select the major forces that will participate in contingency operations, several other tools are used both to help plan which specific units will deploy and to help schedule how these forces are going to be moved to the theater of operations. These tools are part of AMP, an umbrella "fort-to-foxhole" planning system. DART, a computer program that allows planners to rapidly flesh out high-level planning guidance and create force modules. The JFAST is a tool that assists planners in estimating force closure dates in the theater ports of debarkation and provides the theater TPFDD developer with the capability to rapidly create a TPFDD. Additionally, it estimates when the strategic transportation will deliver TPFDD elements into the theater port complexes. Additionally, ELIST provides planners with a tool for analyzing closure profiles from fort-to-port and POD to final destination. Summaries of all four of these tools are in Table J-2.

Table J-2. Current Automated Systems and Software Applications Supporting Theater TPFDD Development

Acronym	Name	Proponent	Users	Use	Remarks
AMP	Analysis of Mobility Platform	USTRANSCOM	USTRANSCOM HQ, USTRANSCOM Transportation Component Command HQs, CINCs, CINC Components and Sub-Components	Set of transportation analysis tools aimed at improving joint transportation planning and execution. Provides planners with a rapid analysis of the transportation feasibility of a specific deployment plan, against a planner defined transportation environment. AMP enables USTRANSCOM to determine, within hours, whether a deliberate or crisis deployment plan is supportable by the DTS.	AMP currently includes the MASS, MIDAS, ELIST, FORCEFLO, and JFAST transportation models, as well as the DART TPFDD editing and LOGGEN sustainment estimating tools. Other transportation and scheduling tools will be added to the AMP suite as they are developed. Secret.

Table J-2. Current Automated Systems and Software Applications Supporting Theater TPFDD Development (continued)

Acronym	Name	Proponent	Users	Use	Remarks
DART	Dynamic Analysis and Replan-ning Tool	USTRANSCOM	USTRANSCOM HQ, USTRANSCOM Transportation Component Command HQs, CINCs, CINC Components and Sub-Components	Provides planner with the capability to rapidly enter, manipulate, and analyze TPFDD force and movement requirements. Includes a distributive collaborative planning capability for the PODs.	Part of the AMP suite of transportation models. Very quick and useful TPFDD editor that has gained wide usage since its development during Desert Storm. Secret.
JFAST	Joint Flow and Analysis System for Transpor-tation	USTRANSCOM	CINCs and Subordinate commands, JCS, USTRANSCOM, Services, Analytical Agencies, and Service schools	High-speed analytical tool used for making detailed estimates of the resources required for transporting military forces (including cargo, personnel, and their sustainment) during various scenarios. Estimates when forces will arrive in-theater.	Part of the AMP suite of transportation models. Secret.
ELIST	Enhanced Logistics Intra-theater Support Tool	HQDA (DCSLOG)	JCS, OSD, USTRANSCOM, PACOM, CENTCOM, EUCOM, USFK, USAREUR	ELIST provides the planner a transportation feasibility tool for analyzing fort to port and POD to TAA portions of the deployment. An RSO&I simulation and analysis tool.	Part of the AMP suite of transportation models. Secret.

ANALYSIS OF MOBILITY PLATFORM

J-5. AMP is being developed under the cognizance of USTRANSCOM. This effort focuses on the cooperative development and integration of automated tools to facilitate end-to-end mobility planning and execution of contingency deployments.

J-6. The AMP effort integrates the capabilities of available systems such as the DART, JFAST, MIDAS, MASS, ELIST, MDSS, and TC-AIMS II, and builds on these capabilities by adding tools where they are lacking.

J-7. For example, ongoing developments such as FORSCOM's MADCAP, FORCEGEN, and Force Flow; MTMC's PORTSIM and STRADSS; and the Army's KBLPS eventually will be integrated into the AMP set of tools. Permitting planners to develop, analyze, and provide the results of crisis deployment options to decision makers within hours and monitor and adjust the deployment during execution.

J-8. All of AMP component tools can run on their own. They can also be run interactively under the AMP suite, and so their databases can be stored. DART and JFAST allow the theater transportation planner to rapidly create a TPFDD, equipment and sustainment of the theater port complexes. This information is important input data to theater LOC planning tools.

DYNAMIC ANALYSIS AND REPLANNING TOOL

J-9. DART provides the analyst with the capability to enter rapidly, manipulate, and analyze force and movement requirements. DART assists the user in rapidly modifying and analyzing the strategic transportation feasibility of a TPFDD. Based on the concept of distributed collaborative planning, DART allows users at remote sites to collaborate interactively in developing deployment and sustainment plans, and to share and transfer TPFDD records between remote DART systems. Using DART, planners can:

- Build and edit new TPFDD records.
- Graphically represent and modify existing TPFDD records.
- Graphically display transportation routes and destinations to help analyze the TPFDD's transportation feasibility.
- Create and manipulate force modules.
- Automatically check the quality of TPFDD records.
- Obtain quick access to the TUCHA file.
- Rapidly look-up GEOLOC.

JOINT FLOW AND ANALYSIS SYSTEM FOR TRANSPORTATION

J-10. JFAST is a high-speed analytical tool used for making detailed estimates of the resources required to transport military forces, including cargo, personnel, and their sustainment, during various scenarios. The primary output of JFAST is an estimation of when forces will arrive at the theater port complexes. In addition, JFAST presents a wealth of graphic and tabular output showing the impact of the theater deployment upon the strategic transportation resources, vehicles, and ports used during the simulation.

J-11. JFAST input primarily comes from JOPES in the form of OPLAN TPFDDs and reference files. JFAST can also import plan TPFDDs from DART, as well as export plans to other transportation models such as the ELIST.

J-12. A potentially very useful feature of JFAST is its capability for creating notional movement requirements for instances in which no plan currently exists. In this situation, an OPLAN or exercise TPFDD may identify where and when the military forces are to be deployed. The JFAST NRG takes division or brigade echelon ground units and squadron echelon air units, as well as expected levels of activity, climate, and desired days of supply, and generates detailed company and detachment level TPFDD deployments. This information can then be used by the JFAST model to estimate closure dates of the generated forces, as well as by the planner for further analysis.

THEATER LOC DEVELOPMENT

J-13. There are few tools available to assist combatant and Service component planners with developing an entire theater LOC concept to support joint RSO&I and sustainment for contingency operations. Most of the existing automated RSO&I planning tools address strategic, rather than theater, deployment.

J-14. Two tools that are currently used to help plan the overall theater LOC are currently in joint use (Table J-3). These are ELIST and SUMMITS.

Table J-3. Current Automated Information Systems and Software Applications Supporting Theater LOC Development

Acronym	Name	Proponent	Users	Use	Remarks
ELIST	Enhanced Logistics Intra-theater Support Tool	Army MTMC-TEA	OSD, JCS, USTRANSCOM HQ, MTMC, CINCs, CINC Components and Sub-Components	Discrete event, simulation-based system that evaluates the logistical feasibility of the theater transportation portion of a course of action. Model theater air, ground, and rail transport assets and transportation infrastructure with object-oriented database. Compares the CONUS and planned theater arrival schedule against a theater's transportation assets, cargo handling equipment, facilities, and routes.	Part of the current AMP suite. Army is currently funding improvements to the model. ELIST networks needed to conduct analysis are available via the MTMCTEA classified web site. Secret.

Table J-3. Current Automated Information Systems and Software Applications Supporting Theater LOC Development (continued)

Acronym	Name	Proponent	Users	Use	Remarks
SUMMITS	Scenario Unrestricted Mobility Model for Intra-theater Simulation	OSD (PA&E)	OSD (PA&E) and JS J4	Evaluates the logistic feasibility of a proposed theater transportation course of action. Quantifies the total requirement for common-user theater transportation to deliver the specified force to its destination.	Very detailed model that requires considerable programming support to use effectively. Secret.
LAD	Logistics Anchor Desk	Army Logistics Integration Agency	HQDA, USAREUR HQ, and other Army planners.	Two-computer system that allows logistics planners to determine the location and status of selected Army materiel inside and outside the theater of operations and, based on that information, plan the logistical force required to support a proposed course of action.	Parent system of KBLPS. Secret.
KBLPS	Knowledge-Based Logistics Planning Shell	Army Logistics Integration Agency	HQDA, USAREUR HQ, and other Army planners.	Interactive DSS that assists logisticians in planning, allocation and transportation of Army support at the corps level. Built-in database includes default information about corps-subordinate combat units, as well as the support slice usually allocated to the units.	Used successfully by XVIII Airborne Corps to help plan Desert Storm operations, and by USAREUR to help plan and sustain Operation Joint Endeavor. Secret.

ENHANCED LOGISTICS INTRATHEATER SUPPORT TOOL

J-15. ELIST is an analytical tool that simulates, from a transportation perspective, the deployment of forces within CONUS (fort-to-port) or a theater (POD to TAA). It helps planners analyze and develop courses of action. ELIST uses an object-oriented database to model unit and host nation transportation assets and theater infrastructure. The theater transportation network is used to move personnel and cargo from fort-to-port or theater entry points such as air and seaports of debarkation to final theater destinations.

J-16. Planners can generate movement scenarios for ELIST from TPFDD data, as well as from several other models, including DART, MIDAS, and JFAST. Movements are constrained by available theater transportation assets and the capacities of the theater infrastructure.

J-17. ELIST can be used to play out a MSEL, which is a list of events that take place at certain times during the simulation. For example, the user can add or subtract transportation resources, further constrain link capacities to simulate enemy action, or close down specific ports to determine the effects of these actions on the overall simulated movement of forces and cargo within the theater transportation network.

J-18. The user interface is a graphical windowing system that integrates maps, data, and a variety of charts, reports, and graphs to show the results of the simulation.

J-19. ELIST does not plan a CONUS or theater LOC; rather, it assesses the feasibility of a proposed LOC.

SCENARIO UNRESTRICTED MOBILITY MODEL FOR INTRATHEATER SIMULATION

J-20. SUMMITS was developed by the Director, Projection Forces, OSD (PA&E) to execute an intratheater deployment simulation based on inputs provided by the user. The simulation moves personnel, unit equipment, and supplies in accordance with defined requirements. Requirements for transportation are processed in priority order, with each requirement being provided an assigned delivery path through established air, road, rail, water, and pipeline networks. Available transport resources are consumed as each requirement is applied to its assigned delivery path.

J-21. SUMMITS quantifies the total requirement for common-user transportation to deliver the specified force and the required logistics support using the established transportation resource assets. Also, the model quantifies the performance of the established transportation network and resource mix in providing timely delivery of the force to its final destination.

J-22. The model produces a wealth of reports that detail the transportation requirement for each transportable commodity represented, which usually includes personnel, unit equipment, sustainment cargo, ammunition, bulk fuel, and water. For example, the trips required per day for a particular vehicle type can be examined as a day by day requirement, a static average daily requirement over a fixed number of days per five day period, or a rolling average daily requirement over a fixed rolling average period.

J-23. SUMMITS is currently being used by the Joint Staff/J4 and OSD (PA&E) to conduct the intratheater lift analysis for two MTWs.

J-24. As with ELIST, SUMMITS cannot plan a theater LOC; rather it assesses the feasibility of a proposed LOC concept.

USING ELIST AND SUMMITS TO PLAN THE THEATER LOC

J-25. Unfortunately, neither ELIST nor SUMMITS can independently develop a proposed theater LOC concept. Also, neither tool is particularly user-friendly, and both require a very knowledgeable planner, a good computer programmer, and detailed inputs. Some of these inputs are:

- A completely planned theater LOC.
- Lift resources available.
- Storage and throughput capacities for each mode and node in the theater.
- Node and link capacities.
- Other theater LOC constraints.
- A planned, detailed TPFDD flow into and within the theater.

J-26. SUMMITS also requires theater campaign results to determine the locations where the unit personnel and equipment must be delivered as a function of time, intensity of combat, and friendly combat success; the combat consumption of all classes of supply played in the model; and a detailed theater logistics support plan.

OTHER THEATER LOC DEVELOPMENT TOOLS

J-27. In addition to these more general LOC planning tools, there are some other tools that can be used to plan specific portions of the LOC. The LAD allows the planner to determine the location and status of selected Army materiel in the theater, while its Knowledge Based Logistics Planning System module assists the planner in developing a logistics concept to support proposed corps-level courses of action.

LOGISTICS ANCHOR DESK AND THE KNOWLEDGE BASED LOGISTICS PLANNING SHELL

J-28. Another tool that can be used to plan the Army corps-level portion of the theater LOC is LAD. It is a two-computer system that allows logistics planners to determine the location and status of selected Army materiel inside and outside the theater of operations and, based on that information, plan the logistical force required to support a proposed course of action. One of the LAD computers runs a situational awareness model that consolidates data from numerous existing Army databases. This model allows the planner to determine what resources are or could be made available for his

operation. Once the resource data is available, the other LAD computer runs a planning and analysis module that uses the data to develop a logistical plan that supports the course of action. The planning and analysis module of the LAD is KBLPS.

J-29. KBLPS is an interactive decision support system that assists logisticians in planning allocation and transportation of support at the corps level. Sponsored by the Logistics Integration Agency, KBLPS is used for instructional purposes at the Army's Command and General Staff College. In addition, the XVIII Airborne Corps used KBLPS successfully during Operation Desert Shield/Desert Storm to help develop the logistics plan.

J-30. The first thing the planner must do to use KBLPS is to move icons representing the corps units onto a map background to show where the units are or will be during the proposed operation. For most common corps-level and lower units, KBLPS has a built-in database that includes default information about corps-subordinate combat units, as well as the support slice usually allocated to those units. The user can change these default values as desired.

J-31. Based on a series of default or user-defined constraints and priorities, KBLPS then generates a simple logistics plan that maximizes the efficient use of available CS/CSS resources within the corps area. KBLPS color-codes the unit icons to show if they can be adequately supported by the plan. Embedded spreadsheets and graphics allow the planner to view various aspects of the plan, including such factors as logistics flow through certain nodes or links, the consumption of logistics by node, and so forth.

J-32. If the planner decides that changes are needed in the plan, he can change constraints, priorities, or resources, and have KBLPS reevaluate the situation. Once he is satisfied with the plan, the decision graphics generated by KBLPS can be of use in preparing his formal, written plan.

J-33. KBLPS is usually used to plan for a 120-hour planning horizon, although there is no fundamental reason that it cannot be used for other time intervals.

J-34. KBLPS is primarily focused on corps level operations, although it has some very limited capabilities to tie into outputs from other databases such as ELIST. For example, KBLPS can read an ELIST-generated file that indicates what materiel shows up at what nodes when. However, there is no direct, real-time link between KBLPS and ELIST.

NODE PLANNING TOOLS

J-35. There are also tools available to assist in the planning of specific nodes in the theater LOC. BRACE can be used to model military aerial port operations and estimate airfield throughput

capability. The ICODES can assist the planner in developing stow plans for ships, while the PORTSIM model simulates seaport operations during a force deployment. These tools are summarized in Table J-4.

Table J-4. Developmental Automated Information Systems and Software Application Supporting Theater LOC Analysis

Acronym	Name	Proponent	Users	Use	Remarks
BRACE	Base Resource and Capability Estimator	AMC	USTRANSCOM HQ, AMC, JFACCs, Air Staff Planners	Simulates airfield onloading, off-loading, en route, and recovery base operations, including ground activities such as cargo handling, refueling, maintenance, and aircraft parking. Estimates airfield throughput capability.	Currently in advanced development. May be incorporated into GTN. Unclassified.
ICODES	Integrated Computerized Deployment System	MTMC	MTMC Terminals	Assists in the pre-stowage process by matching a vessel characteristic file against the cargo being offered for shipment to produce a vessel stowage plan. Calculates critical sailing characteristics, including trim and stability.	Usually used in conjunction with unit moves. Interfaces with DAMMS-R. Unclassified.
PORTSIM	Port Simulation	MTMC	MTMC Terminals	Simulation of seaport operations during a force deployment. Provides a port clearance profile over time and reports on use of port assets such as gates, holding areas, berths, rail, drivers, and other parameters.	Usually used in conjunction with unit moves. Interfaces with ICODES. Unclassified.

AERIAL PORT PLANNING TOOLS

J-36. In general, most of the passengers that enter the theater of operations arrive at the Joint Aerial Ports. An automated planning tool being developed by Air Mobility Command to model military air terminal operations is BRACE. It simulates airfield onloading, off-loading, en route, and recovery base operations, including ground activities such as cargo handling, refueling, maintenance, and aircraft parking. The model can be used to:

- Estimate airfield throughput capability.
- Estimate air, ground, and other resources required to support a given level of throughput at an airfield.
- Validate MOG values used in existing air transportation models such as MASS and JFAST.

J-37. The GTN Program Management Office is currently investigating the desirability of including BRACE as part of the planning tools available as part of the AMP suite.

SEAPORT PLANNING TOOLS

J-38. The Joint Water Ports in the theater of operation are critical to the success of the operation because most of the Army and Marine unit equipment and sustainment cargo will be received through them. Two of the most useful tools for assisting in planning SPOE/D operations are ICODES and PORTSIM.

INTEGRATED COMPUTERIZED DEPLOYMENT SYSTEM

J-39. ICODES is a decision support system for developing stow plans for ships. ICODES assists the user in developing stow plans by matching vessel characteristics against the cargo being offered for shipment. ICODES develops the stow plans for up to four specific ships concurrently while continuously checking for access and hazard violations. At the user's request, ICODES can automatically attempt to maintain unit integrity in the stow plans it develops.

J-40. Once the stow plans are completed, ICODES automatically generates ship manifests and templates cargo items onto ship drawings in a matter of minutes. ICODES includes video films of ship decks and cargo items, a wealth of customized reports that detail both the process of constructing the stow plans and results of the process. It also includes a database, which provides details on the availability of external ship ramps and the facilities for many ports around the world.

PORT SIMULATION MODEL

J-41. PORTSIM is a LIN level, time-stepped, discrete event simulation of seaport operations during a force deployment. PORTSIM provides port clearance profiles over time and reports use of port assets.

J-42. PORTSIM loads individual cargo items aboard ship by size and stow factor. Once an interface between PORTSIM and ICODES is established via a load sequencing agent, the model will load ships using ICODES developed stow plan.

J-43. Future development of PORTSIM will include 2- and 3-D animation, interfaces to execution systems, databases, and scheduling models, and a port network building capability for TAV/ITV.

COMBINED FORCES PLANNING AND EXECUTION TOOLS

J-44. Since the end of the Cold War, the US military has participated in several operations, almost all of which were conducted in cooperation with allied nations. There is every reason to believe that future operations will continue to be conducted as multinational operations. The ACE ADAMS and ACCIS are two computerized systems that are in widespread use among NATO countries. These systems are likely to be used by US and NATO forces in future operations both within and outside NATO's historical AOR.

J-45. ADAMS is intended to fulfill the requirements for a Joint Reception and Movement System within NATO. It is a personal computer-based system that processes data up through the NATO SECRET classification. The structure of ADAMS recognizes that many nations already have national automated deployment systems. Its function is to facilitate the exchange of movement plans, situation reports, and associated background data in agreed formats between the national automated systems and allied headquarters.

J-46. There is no central database envisioned for ADAMS. Instead, the data elements reside with the parent nation or headquarters. The data are transmitted to other users in a standard format on an as-required basis. The development to date has focused on data and planning requirements.

J-47. Although the final configuration of ADAMS is still evolving, it currently includes the following modules:

- Force Selection.
- Rough Planning.
- Detailed Planning.
- Force Databases.
- Assets Databases.
- Infrastructure Database.
- Deployment Display.

J-48. The current version of the system is available at all national headquarters (except Portugal), and at SHAPE, the three MSC headquarters, the ARRC, and NATO's RFAS. The connectivity between US systems and ADAMS is retained at USEUCOM headquarters. Future developments include the addition of more capable analysis tools and capabilities to monitor deployment executions.

J-49. The ACCIS is the primary NATO system used by SACEUR to exercise command and control over the activities of allied forces in the Allied Command Europe area of responsibility. ADAMS is one of its several components.